

1. (Amended) A dry gray-scale image processor which extracts unexposed films one by one and carries them to an exposure unit, radiates a laser beam according to an image data signal onto the film as it passes said exposure unit, and develops the exposed film by heating it at a heating unit, wherein

an interval between an exposure position of said exposure unit and a heat start position of said heating is shorter than the length of the film in the delivery direction, and the exposure process and heating process are performed in parallel simultaneously,

said heating unit comprises a film passage, provided between heating blocks which are arranged on either side of said film, and

said film passage comprises two fluororesin coated opposing surfaces having a constant width therebetween.

25. (Amended) A dry gray-scale image processor as described in one of claims 1, 3, 5, 7, 13, 15, 17 and 19, wherein a cooling region is provided at the exit of said heating unit, and flatness regain rollers are provided after the cooling region.

Please cancel Claims 2, 4, 6, 8 through 12, 14, 16, 18, and 20 through 24, without prejudice or disclaimer of the subject matter contained therein.

REMARKS

Claims 1, 3, 5, 7, 13, 15, 17, 19, and 25 are now pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejection(s) in view of the amendments and remarks contained herein.

DRAWINGS

As requested by the Examiner, Applicant has included proposed drawing changes which label Figures 4 and 5 as –Prior Art–. The proposed changes are highlighted on the drawings. Please accept these proposed drawing amendments. No new matter is added.

CLAIM OBJECTION

Claim 1 stands objected to because of informalities. Claim 1 has been amended as suggested by the Examiner to overcome this objection.

REJECTIONS UNDER 35 U.S.C. § 103

Claims 1-4, and 13-16 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Imai et al. (U.S. 5,975,772) in view of Imai (U.S. 6,023,283). Claims 5-12, and 17-24 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Imai et al. ('772) in view of Imai ('283), as applied to claims 1-4 above, and further in view of Arai et al. (U.S. 6,214,103). Claims 1/25-4/25 and 13/25-16/25 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Imai et al. ('772) in view of Imai ('283), as

applied to claims 1-4 above, and further in view of Ozaki et al. (U.S. 5,887,202). These rejections are respectfully traversed.

In the dry gray-scale image processor of Claim 1 of the above-referenced application, a heating unit for developing an exposed film comprises a film passage which is provided between heating blocks which are arranged on either side of the film, and the film passage comprises two opposing surfaces on which a fluororesin such as Teflon™ is coated. Therefore, the exposed film can be carried smoothly through the film passage without snagging and the like, and damage to an emulsion face of the film by sliding can be prevented when the emulsion face contacts the surface. The reason for employing fluororesin as the coating material for the film passage is that the temperature of the film in the film passage exceeds 100°C and the emulsion face becomes very sticky, and only a fluororesin, which has high thermal resistance as well as low coefficient of friction, can be used in such circumstances. In addition, thickness of the fluororesin coating is generally restricted to 20 through 30 μ m so as not to reduce heating capacity of the heating unit.

Furthermore, in the dry gray-scale image processor of claim 25 of the above-referenced application, a cooling region which is provided at an exit of the heating unit, and flatness regaining rollers are provided after the cooling region. This makes it possible to prevent warping of the film due to heating.

Claim 1 has been amended herein and recites features which are clearly not disclosed or suggested by Imai et al. (U.S. Patent No. 5,975,772) or by Imai (U.S. Patent No. 6,023,283). The Examiner states that the feature discussed above with respect to Claim 1 (fluororesin coating on the film passage) is disclosed in United States

Patent No. 6,215,103 (Arai, et al.). However, a coating of Arai (heat insulation material 66) is not provided for preventing damage of the emulsion face of the film but for performing heat insulation of the heating unit. Furthermore, a fluororesin such as Teflon is different from a fluororesin resin which is used as the heat insulation material since thermal conductivity of Teflon is 6 Kcal/kg°C in comparison to that of a fluorocarbon resin which is 0.09 through 0.216 Kcal/kg°C as described in lines 36 through 39 in column of the specification of Arai. In addition, Teflon cannot be employed for the heat insulation material of Arai, since thermal conductivity of the material which is used as the heat insulation material is determined to be 1 Kcal/kg°C and less as described in lines 28 through 35 in column 11 of the specification of Arai. Furthermore, the heat insulation material must be thickened to maintain the heat insulation capacity, whereas thickness of the fluororesin coating of the above-referenced application must be thinned so as not to reduce heating capacity of the heating unit as described above. Therefore, the fluororesin coating of the above-referenced application and the heat insulation material of Arai are different in their purpose, materials, and specific features.

Moreover, the Examiner also states that the above feature of Claim 25 (the cooling region and flatness regain rollers are provided at the exit of the heating unit) is disclosed in United States Patent No. 5,887,212 (Ozaki, et al.). However, as described in lines 28 through 53 in column 21 of the specification of Osaki, a region denoted by reference numeral 104 in Ozaki is not the cooling region but is a drying region, and a fan 108 is not for cooling the film but for drying the film by blowing warm air. Furthermore, rollers 72 and 110 are not for flattening the film but for driving an endless belt 74, and these rollers are not provided after the cooling region but are

provided before the drying region 104. Therefore, the features of Claim 25 of the above-referenced application are not disclosed in Ozaki.

As explained above, the above citations do not teach the significant features of the present invention as claimed, which have direct bearing on the advantages of the above-referenced application. Therefore, the present invention as claimed is not obvious from the citations.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: 13 Nov 02

By: Michael E. Hilton
Michael E. Hilton
Reg. No. 33,509

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

ATTACHMENT FOR CLAIM AMENDMENTS

The following is a marked up version of each amended claim in which underlines indicates insertions and brackets indicate deletions.

1. (Amended) A dry gray-scale image processor which extracts unexposed films one by one and carries them to an exposure unit, radiates a laser beam according to [comprising] an image data signal onto the film as it passes said exposure unit, and develops the exposed film by heating it at a heating unit, wherein

an interval between an exposure position of said exposure unit and a heat start position of said heating is shorter than the length of the film in the delivery direction, and the exposure process and heating process are performed in parallel simultaneously,

said heating unit comprises a film passage, provided between heating blocks which are arranged on either side of said film, and

said film passage comprises two fluororesin coated opposing surfaces having a constant width therebetween.

25. (Amended) A dry gray-scale image processor as described in one of claims 1, 3, 5, 7, 13, 15, 17 and 19 [1 to 24], wherein a cooling region is provided at the exit of said heating unit, and flatness regain rollers are provided after the cooling region [flatness region rollers are provided at the exit of said heating unit with a cooling region therebetween].

Please cancel Claims 2, 4, 6, 8 through 12, 14, 16, 18, and 20 through 24,
without prejudice or disclaimer of the subject matter contained therein.